

RUMMA

Measuring Antibiotic Use

General principles

Measuring antibiotic sales and use is important in order to identify relevant trends and risk factors and inform risk management priorities, as well as define targeted measures to combat AMR and monitor their effect.

The main difference between antibiotic sales and use is that sales is at the beginning of the medicine distribution chain (e.g. representing what is sold by Marketing Authorisation Holders for use in animals). Antibiotic use, however, is closer to the end user and represents what is prescribed, dispensed, administered, delivered and/or purchased for a defined animal species and/or sector (e.g. from veterinary surgeons, feedmills and/or farmers). For this reason, antibiotic use data can be split by species and/or sector, whereas, because many products are licensed for multiple species, this is not possible with antibiotic sales data.

When describing antibiotic sales and usage, a metric is usually used which quantifies use of antimicrobials during a specified time period, usually involving a numerator expressed in relation to a denominator:

- A **numerator** refers to a measure of the amount of antimicrobials sold or used
- A **denominator** is a measure of the animal population at risk of being treated

At a national level, when analysing sales data for food producing animals, the most common metric used in the UK and across Europe is “mg/PCU”, where:

- The numerator relates to “mg of antibiotic active ingredient” used in food producing animals
- The denominator (PCU) relates to an estimate of the weight of the animal population at risk in kg (using standardised weights that aim to represent the average weight at time of treatment).

This methodology is used in both the [UK-VARSS report](#) and the European [ESVAC report](#). The VMD has also published a [guide to understanding the PCU](#).

Antibiotic use data can be split by species and/or sector. When considering metrics for monitoring antibiotic use data, there are two key types:

- **National metrics** – to allow for trend monitoring for the species and/or sector

- **Farm-level metrics** – these allow for benchmarking, i.e. the comparison of a party’s antibiotic use with antibiotic use in a population of similar farms

These metrics for national and farm-level monitoring may or may not be the same (e.g. using number of animals slaughtered can be useful when calculating a denominator for a national indicator but is not appropriate as a farm-level indicator for farms which sell animals before slaughter). The different national and farm-level indicators used by the livestock sectors in the UK are summarised below:

Dairy

For the dairy sector, antibiotic use is being collected by the [Medicine Hub](#), which can include data from veterinary surgeons and farmers.

The core metrics for national and farm-level analysis, which were developed by the Cattle Health and Welfare Group (CHAWG) Antimicrobial Usage Subgroup, are:

- **Mg/kg** – where mg is milligrams of antibiotic active ingredient where the kg animals at risk is calculated by multiplying the average number of dairy cows by 425kg (the same weight as used in the PCU calculation)
- **Average number of antibiotic courses per dairy cow for lactating and dry cow therapy** - where it is assumed that 4 tubes represent a course for dry cow therapy and 3 tubes represent a course for lactating cow therapy

Further details can be found in the [Dairy Benchmarking Metrics Report](#) and [Supplementary material for beef and dairy benchmarking](#), which also includes details on additional metrics for measuring antibiotic use in calves up to six months of age.

Beef

For the beef sector, antibiotic use is being collected by the [Medicine Hub](#), which can include data from veterinary surgeons and farmers.

For national analysis, a mg/kg metric is recommended, following the same categories and weights as used for the PCU, shown below:

Category	Weight Assigned
Number of cows slaughtered	425kg
Number of heifers slaughtered	200kg
Number of bullocks and bulls slaughtered	425kg
Number of calves and young cattle slaughtered	140kg

Creating metrics for farm-level monitoring is more complex, as some beef farms sell before slaughter and there are a wide range of systems in operation, from dairy calf rearing to suckler cows, store cattle growing to finishing. However, following an extensive consultation, a mg/kg beef benchmarking metric for farm-level monitoring was created by the CHAWG Antimicrobial Subgroup and published in a [Beef Benchmarking Metrics Report](#) and [Supplementary material for beef and dairy benchmarking](#). This also includes details on additional metrics for measuring antibiotic use in calves up to six months of age.

Sheep

For the sheep sector, antibiotic use is being collected by the [Medicines Hub](#), which can include data from veterinary surgeons and farmers.

Advice on measuring antibiotic use in sheep production was published by the [Sheep Antibiotic Guardian Group](#) and is detailed in its [Calculation of metrics for benchmarking antibiotic use on sheep farms](#) report.

For both the national and farm-level monitoring, a core mg/kg metric is recommended, using the same categories and weights as included in the PCU calculation, and shown below:

Category	Weight Assigned
Total number of lambs	20kg
Number of Ewes	75kg

For farm level monitoring, an additional metric for antibiotics given to lambs at less than a week old is also included, as follows:

Total antibiotic treatment days for lambs of less than one week

Total number of lambs born on farm

Pigs

For the pig sector, antibiotic use is being collected by the [electronic Medicines Book \(eMB\)](#) for pigs, which can include data from veterinary surgeons, feedmills and farmers. Uploading usage data to this portal is a requirement of the farm assurance schemes [Red Tractor](#) and [Quality Meat Scotland](#) and therefore antibiotic use data for 95% of animals in the sector is captured in this way.

For national monitoring, a mg/kg metric is recommended using the same categories and weights as included in the PCU calculation, i.e. 65kg for slaughtered pigs and 240kg for livestock sows. However, this cannot be used for farm level benchmarking (as not all pig farms produce pigs for slaughter). The following categories and weights (which are based on the PCU) are therefore used for farm level benchmarking within eMB:

Category	Weight Assigned
Weaned piglets (up to 5 weeks of age) that have moved off the holding for finishing	4kg
Weaners/ growers (over 5 weeks of age) that have moved off the holding for finishing	25kg
Finishers leaving	65kg
Breeding animals (gilts and boars) that have moved off the holding	65kg
Average number of sows/boars	240kg

Laying hens

For the laying hen sector antibiotic use data is collected at farm-level by the [British Egg Industry Council](#), which covers over 90% of the UK laying hen industry, and this is a requirement under the [British Lion Code of Practice](#).

The metric used is % bird days, which is calculated as follows:

Number of bird days treated*

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Number of bird days at risk**

* calculated by adding up the total number of days that birds have received an antibiotic e.g. if 500 birds received 4 days of treatment this would be $(500 \times 4) = 2000$ bird days treated

** calculated by adding up the total number of days that birds were on the farm, e.g. if 1000 birds were on the farm for the whole year this would be $(1000 \times 365) = 365000$ bird days at risk.

Meat Poultry

For the meat poultry sectors (broiler chickens, turkeys and ducks), antibiotic use is being collected by the British Poultry Council, which represents 90% of the industry. The data is submitted by producers and is primarily obtained from veterinary dispensing/ prescription data.

For national and farm-level monitoring, a mg/kg metric is used where the denominator is based on the number of animals slaughtered and the category weights are based on the PCU:

Species	Weight Assigned
Number of chickens slaughtered	1kg
Number of turkeys slaughtered	6.5kg
Number of ducks slaughtered	1.75kg

Gamebirds

For the gamebird sector, antibiotic use is being collated using data from gamebird vets and feed-mills by the Game Farmers Association, and represents 90% of the industry. This is reported as total tonnes of antibiotic used.

Salmon

For the salmon sector, antibiotic use is being collected from veterinary practices by the Salmon Scotland, and represents 100% of Scottish Salmon production. This is reported as mg/kg, where the denominator is identical to the PCU and represents the liveweight of slaughtered fish.

Trout

For the trout sector, antibiotic use is being collected from veterinary practices by the British Trout Association, and represents 90% of UK trout production. This is reported as mg/kg, where the denominator is identical to the PCU and represents the liveweight of slaughtered fish.